In the third paper,[17] dealing with chromosome reduction, the material used was *Smilacina*, *Kniphofia*, and *Aloe*. LAWSON finds no continuous spirem at any stage, but always a number of separate threads, probably as many as there are chromosomes. Even in the reticulum the threads are double and the double character becomes more pronounced in later prophase. If these two parts of each chromosome should separate at this stage, an ordinary vegetative division with the diploid number of chromosomes would result; but, as the threads shorten and thicken, the double character becomes indistinguishable, so that each thread appears single. These apparently single threads now unite laterally in pairs, forming bivalent chromosomes, and the two members of the bivalent chromosome are separated at the heterotypic mitosis, so that entire vegetative chromosomes pass to the pole, thus accomplishing the reduction in number. Although the conclusions are contrary to generally accepted views, the figures and arguments seem convincing.—CHARLES J. CHAMBERLAIN.

**Changed permeability and antagonism.**—During the last half-decade LEPESCHKIN, TRÖNDLE, and other workers have developed accurate methods for determining the rate at which various solutes (NaCl, $KNO_3$, glycerine, glucose, etc.) enter the plant cell. LEPESCHKIN states the degree of permeability in the following unit: molecular weight entering unit surface of the cell in unit time per average mol difference in concentration inside and outside the cell. These methods have been applied in determining the effect of various conditions and reagents upon the permeability of the protoplasm to the solutes studied. The work as a whole establishes that marked changes in permeability to nutrient salts and other solutes are produced by variations in temperature or light-intensities and by the application of anesthetics or certain salts. It also involves definite measurement of the magnitude of the permeability changes and leads to the generalization that in nature the protoplasm of plant cells changes in its degree of permeability from hour to hour with the changing condition, and that there exist daily, seasonal, and annual rhythms of permeability changes. It is rather hard to over-emphasize the physiological significance of these facts in explaining some phases of plant activities. For example, LEPESCHKIN has found that variation movements in plants are caused in the main by modified permeability of pulvinal cells to contained solutes, which is induced by changing environment or internal conditions.

Now SZÜCS[18] believes he has shown that the antagonistic action of various metallic ions toward other metallic ions, alkaloids, and basic dyes is due to the antagonistic ions reducing the rate at which the toxic agents mentioned enter

[17] LAWSON, A. A., A study in chromosome reduction. Trans. Roy. Soc. Edinburgh **48**:601–627. *pls. 1–3.* 1912.

[18] SZÜCS, JOSEPH, Experimentelle Beiträge zu einer Theorie der antagonistischen Ionenwirkungen. Jahrb. Wiss. Bot. **52**:85–142. 1912.

the protoplasm. He first makes a study of the antagonism of $AlCl_3$ to $CuSO_4$. For this study he uses the hypocotyls of *Cucurbita Pepo*, which are placed in the solution to be tested for a given time, removed, rinsed with distilled water, and dried with filter paper, then placed in a horizontal position in saturated air, and after 24 hours examined for geotropic response. The length of exposure at a standard temperature in a given solution that nulls geotropic reaction in 70 per cent of the hypocotyls is termed the life-duration for the solution. In 0.025 *n* $CuSO_4$, the life-duration is less than 40 minutes; but if the solution also contains 0.15 *n* $AlCl_3$, the life-duration is 4 hours. In this concentration of $CuSO_4$ higher or lower concentrations of $AlCl_3$ give shorter life-durations. In 0.005625 *n* $CuSO_4$ the life-duration is about one hour, but if $AlCl_3$ is present in 0.025 *n* concentration, the life-duration is 22 hours; and if in 0.07 *n* concentration, 26 hours. The author shows that in a given $CuSO_4$ solution for a given time far less copper enters the hypocotyl when $AlCl_3$ is present, but it is to be regretted that his determinations of copper were not quantitative. It is maintained that the slower entrance of the copper salt in the presence of $AlCl_3$ is due to a lowering of the permeability of the plasma, as such, to the former, and not to the other possibility of lowered toxicity, for concentrations of $AlCl_3$ that are themselves quite injurious to the cells lower markedly the rate of entrance of $CuSO_4$. Potassium nitrate showed some antagonism against the toxicity of quinine hydrogen chloride and methyl violet to *Spirogyra*. The nitrate of calcium was much more effective in this respect, and it in turn was greatly excelled by the nitrate of aluminium. In these cases also antagonistic action seems to be due to reduced permeability. Inorganic salts are not constantly antagonistic to the toxic action of piperidine on *Spirogyra;* while some increase the toxicity, others lower it. The effect in these cases is a function of both the kation and the anion, although the kations are predominant in their influence. Slight traces of alkaloids and basic dyes in the protoplasm render it more subject to deformation by the salts used, whether the latter act antagonistically or not.—WM. CROCKER.

**Wild wheat in Palestine.**—The discovery of wild wheat in Palestine by AARONSOHN has attracted a great deal of attention, chiefly because of the possible practical importance of a hardy race of wheat. This Palestinian wheat has now been under observation and culture for three or four years, and the general results have been summarized by COOK[19] in a bulletin of the Bureau of Plant Industry. The whole bulletin is of interest, but only certain general conclusions can be selected for mention.

The wild wheat was discovered on Mount Hermon, but later it was found growing under very different conditions in the Jordan Valley, and probably has a much wider range. It is especially abundant on limestone formations,

[19] COOK, O. F., Wild wheat in Palestine. Bull. 274, Bur. Pl. Ind., U.S. Depart. Agric. pp. 56. *figs. 11. pls. 15.* 1913.